WHAT IS CLAIMED IS:

1. A pattern width measuring apparatus for measuring pattern width of a pattern formed on a wafer using an electron beam, comprising:

an electron beam generating section for generating the electron beam;

a deflector for scanning the pattern with the electron beam by deflecting the electron beam;

a first secondary electron detector and a second secondary electron detector for detecting secondary electrons generated when the electron beam is irradiated on the wafer or the pattern;

a first edge detector for detecting position of a first edge of the pattern based on the quantity of the secondary electrons detected by said first secondary electron detector out of said first secondary electron detector and said second secondary electron detector;

a second edge detector for detecting position of a second edge of the pattern based on the quantity of the secondary electrons detected by said second secondary electron detector out of said first secondary electron detector and said second secondary electron detector; and

a pattern width computing section for computing pattern width of the pattern based on the position of the first edge and the position of the second edge detected by said first edge detector and said second edge detector.

2. The pattern width measuring apparatus as claimed in claim 1, wherein

said first edge detector detects the position of the first edge which is located farther than the second edge from said first

edge detector, and

said second edge detector detects the position of the second edge which is located farther than the first edge from said second edge detector.

3. The pattern width measuring apparatus as claimed in claim 1, wherein,

said first edge detector detects irradiation position of the electron beam at which the quantity of the secondary electrons detected by said first secondary electron detector has a local minimum as the position of said first edge, and

said second edge detector detects irradiation position of the electron beam at which the quantity of the secondary electrons detected by said second secondary electron detector has a local minimum as the position of said second edge.

4. The pattern width measuring apparatus as claimed in claim 1, wherein

said first edge detector detects the irradiation position of the electron beam at which the quantity of the secondary electrons detected by said first secondary electron detector has a local minimum as a bottom edge, which is a bottom end of the first edge,

said second edge detector detects the irradiation position of the electron beam at which the quantity of the secondary electrons detected by said second secondary electron detector has a local maximum as a top edge, which is a top end of the first edge, and

said pattern width computing section further computes horizontal dimension of the first edge further based on the position of the bottom edge and the position of the top edge detected by said first edge detector and said second edge detector, respectively.

5. The pattern width measuring apparatus as claimed in claim 1, further comprising a third edge detector for detecting the position of the first edge and the second edge based on sum of the quantity of the secondary electrons detected by said first secondary electron detector and the quantity of the secondary electrons detected by said second secondary electron detector, wherein

said pattern width computing section computes the pattern width of the pattern by selecting either the position of the first edge and the position of the second edge detected by said first edge detector and said second edge detector respectively, or the position of the first edge and the position of the second edge detected by said third edge detector, based on the shape of the pattern.

6. The pattern width measuring apparatus as claimed in claim 1, further comprising a third edge detector for detecting the irradiation position of the electron beam at which derivative of the sum of the quantity of the secondary electrons detected by said first secondary electron detector and the quantity of the secondary electrons detected by said second secondary electron detector has a local maximum as a top edge, which is a top end of the first edge, wherein

said first edge detector detects the irradiation position of the electron beam at which the quantity of the secondary electrons detected by said first secondary electron detector has a local minimum as a bottom edge, which is a bottom end of the first edge, and

said pattern width computing section further computes horizontal dimension of the first edge based on the position of

the bottom edge detected by said first edge detector and the position of the top edge detected by said third edge detector.

7. The pattern width measuring apparatus as claimed in claim 1, further comprising a third secondary electron detector for detecting secondary electrons generated when the electron beam is irradiated on the wafer or the pattern, wherein

said first edge detector selects either said first secondary electron detector or said third secondary electron detector based on direction of the first edge, and detects the position of the first edge of the pattern based on the quantity of the secondary electrons detected by said selected first secondary electron detector or said selected third secondary electron detector.

8. The pattern width measuring apparatus as claimed in claim 1, further comprising a third secondary electron detector and a fourth secondary electron detector for detecting the secondary electrons generated when the electron beam is irradiated on the wafer or the pattern, wherein

said first secondary electron detector and said second secondary electron detector are oppositely disposed across an optical axis of the electron beam,

said third secondary electron detector and said fourth secondary electron detector are oppositely disposed across the optical axis of the electron beam along a direction substantially perpendicular to the direction along which said first secondary electron detector and said second secondary electron detector are disposed, and

said first edge detector detects the position of the first edge of the pattern based on the quantity of the secondary electrons detected by said third secondary electron detector instead of said

first secondary electron detector and said second edge detector detects the position of the second edge of the pattern based on the quantity of the secondary electrons detected by said fourth secondary electron detector instead of said second secondary electron detector when an angle formed between a direction from the first edge to the second edge and a direction from said first secondary electron detector to said second secondary electron detector is larger than an angle formed between the direction from the first edge to the second edge and a direction from said third secondary electron detector to said fourth secondary electron detector.

9. The pattern width measuring apparatus as claimed in claim 1, further comprising an objective lens for focusing the electron beam deflected by said deflector onto the wafer or the pattern, wherein

said first secondary electron detector and said second secondary electron detector are provided above said objective lens, and detect the secondary electrons generated when the electron beam is irradiated on the wafer or the pattern through said objective lens.

10. The pattern width measuring apparatus as claimed in claim 9, wherein said objective lens is an electrostatic lens.

11. The pattern width measuring apparatus as claimed in claim 9, wherein said first secondary electron detector and said second secondary electron detector are oppositely disposed across an optical axis of the electron beam.

12. A pattern width measuring method for measuring pattern width

of a pattern formed on a wafer using an electron beam, comprising steps of:

generating the electron beam;

scanning the pattern with the electron beam by deflecting the electron beam;

detecting secondary electrons by the first secondary electron detector and the second secondary electron detector, the secondary electrons being generated when the electron beam is irradiated on the wafer or the pattern;

detecting position of a first edge of the pattern based on the quantity of the secondary electrons detected by the first secondary electron detector out of the first secondary electron detector and the second secondary electron detector;

detecting position of a second edge of the pattern based on the quantity of the secondary electrons detected by the second secondary electron detector out of the first secondary electron detector and the second secondary electron detector; and

computing pattern width of the pattern based on the position of the first edge and the position of the second edge detected by said first edge detecting step and said second edge detecting step.

13. An electron beam exposure apparatus for measuring pattern width of a pattern formed on a wafer using an electron beam, comprising:

an electron beam generating section for generating the electron beam;

a deflector for scanning the pattern with the electron beam by deflecting the electron beam;

a first secondary electron detector and a second secondary electron detector for detecting secondary electrons generated when

the electron beam is irradiated on the wafer or the pattern;

a first edge detector for detecting position of a first edge of the pattern based on the quantity of the secondary electrons detected by said first secondary electron detector out of said first secondary electron detector and said second secondary electron detector;

a second edge detector for detecting position of a second edge of the pattern based on the quantity of the secondary electrons detected by said second secondary electron detector out of said first secondary electron detector and said second secondary electron detector; and

a pattern width computing section for computing pattern width of the pattern based on the position of the first edge and the position of the second edge detected by said first edge detector and said second edge detector.